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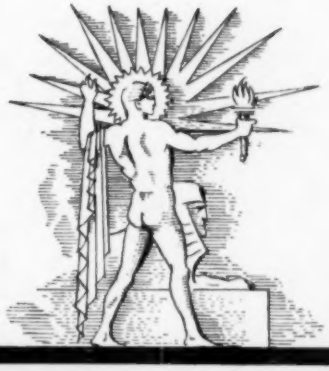
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



April 20, 1940

Beauty of Spring

See Page 242

A SCIENCE SERVICE PUBLICATION

Do You Know?

Southern Africa has *copper* deposits so large that they may be the world's greatest.

Dried *prunes* contain vitamin A and all known members of the vitamin B complex.

New *prefabricated* units for building low cost wooden houses are being studied experimentally at the National Bureau of Standards.

A U. S. Army general said recently: "*Roads* rank in importance with the soldier and his weapons as elements in the national defense."

As an aid in overlapping aerial *photo maps* of Antarctica's vast snow wastes, photographers drop bombs of carbon black powder on the snow.

A *cascade* being constructed for the New York World's Fair will be 120 feet high and will show six tons of water falling at any given instant.

●RADIO

Watson Davis, director of Science Service, will report the meeting of the National Academy of Sciences and will give "A Look Into the Future" on "Adventures in Science" over the coast to coast network of the Columbia Broadcasting System, Thursday, April 25, 4:15 p.m., EST, 3:15 CST, 2:15 MST, 1:15 PST.

Listen in on your local station. Listen in each Thursday.

NEW BOOKS ON SCIENCE—SPRING 1940

This issue contains the semi-annual list of current books in various scientific fields, published or to be published during the first half of 1940. Some of them are the first books published in America on new advances in science. Others are revisions of standard works which you need in your library.

Science Service will obtain for you any American book which is in print, paying postage in the United States. Send check or money order to cover regular retail price ($5 if price is unknown, change to be remitted). When publications are free, send 10c for handling. Address: Book Department, SCIENCE NEWS LETTER, *2101 Constitution Ave., Washington, D. C.*

ASTRONOMY

Watch for Moon Eclipse On Sunday, April 21

PUT down in your engagement book for Sunday evening, April 21: A look at an eclipse of the moon visible in all parts of the U.S.A. where the sky is clear. The dark core of the earth's shadow streaming out in space will not actually take a bite out of the moon's disk, but the moon will pass within the penumbra or outer shadow. A darkening of the moon's disk ought to remain noticeable from about a half hour before the peak of the eclipse until about a half hour after. Time table: Moon enters the penumbra 9:28 p.m. The southern limb of the full moon passes within three minutes of arc of the dark core of the earth's shadow 11:27 p.m., moon leaves penumbra 1:26 a.m. (Monday morning) Eastern Standard Time.

Science News Letter, April 20, 1940

One-third of Britain's population has been *re-housed* since the World War.

BOTANY

Cherry Blossoms Bring Promise of Spring

See Front Cover

DESPITE unsettled world conditions, April brings the cherry blossoms and the spring meetings of science organizations. The blooms in all stages from early bud to wide flower are shown on the front cover of this week's SCIENCE NEWS LETTER as seen by the camera of Fremont Davis, Science Service staff photographer.

This week also we have reports from the American Chemical Society. Last week brought reports from medical and psychological associations. The spring gatherings come to a peak with the meetings of the American Philosophical Society, the National Academy of Sciences, the American Physical Society, and the Geophysical Union during the coming fortnight.

Science News Letter, April 20, 1940

A new *bicycle* can be folded in the middle for more compact storage.

SCIENCE NEWS LETTER

Vol. 37 APRIL 20, 1940 *No. 16*

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 2101 Constitution Avenue, Washington, D. C. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

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Entered as second class matter at the post-office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

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PHYSICS

4,900-Ton Atom Smasher Financed by Rockefeller

$1,150,000 Given to University of California For Cyclotron To Produce More than 100,000,000 Volts

THE ROCKEFELLER Foundation of New York City has given the University of California $1,150,000 for the construction of a new and much larger cyclotron or atom smasher. In making this announcement, however, Dr. Robert G. Sproul, president of the University, called attention to the fact that to obtain this gift, the Berkeley institution will have to raise another $250,000 from other sources.

The plans for the new cyclotron call for a mechanism, or a fine integration of mechanisms, that will produce energies in excess of 100 million volts, as compared with the 33 million volts produced by the University's present 60-inch cyclotron.

The weight of the new cyclotron will be 4,900 tons, or more than 20 times heavier and bigger than the present instrument.

The University's present cyclotron, largest in the world, is said to have permitted striking new advances in the knowledge of the atom and also in the fields of biology and medicine, particularly through its production of artificially radioactive substances and its potent neutron rays.

As compared to the 60-inch magnet of the present cyclotron, the magnet of the new instrument will measure 184 inches. It is hoped to produce a deuteron beam of 140 feet, as compared with the five-foot beam obtainable at present.

The new cyclotron will be 58 feet long and 15 feet wide and will have an over-all height of 36.8 feet, of which 11.8 feet will be underground. From the emplacement the superstructure will rise to 25 feet.

Estimated weight of the steel that will be used in construction is 4,500 tons, to which the copper windings will add 400 tons.

A feature will be the underground location of the control room, 150 feet from the cyclotron itself.

The new cyclotron will resemble the present medical cyclotron, but in details it is planned to be the most distinctive engine of its kind in the world. The designers in the University's radiation laboratory state that, because it is the first of its size ever planned or even contemplated, its actual operation may compel changes that cannot be predicted at present.

Technically, the new cyclotron is expected to show, in a quantity sufficient for observation, the types of phenomena observed in cosmic rays. More simply, its primary objective is to study new regions in the atom, which itself is an infinitesimal planetary system. More simply still, it will endeavor to wrest from the atomic substances that make up all matter the secrets of the energies that make plants and animals grow.

At this stage its objectives are of a purely physical nature, with the structure of matter as the particular problem to be solved. However, as Prof. Ernest O. Lawrence, director of the radiation laboratory, points out, no one knows what new objectives it may light up or what new problems it may produce or solve.

Science News Letter, April 20, 1940

GENERAL SCIENCE

Invasion of Denmark Endangers Research Center

GERMANY'S invasion of Denmark jeopardizes one of the world's important centers of atomic research, the laboratories of Prof. Niels Bohr in Copenhagen. In the troubled years since the rise of Hitler the laboratories have been more than once a place of refuge of scientists who have escaped, one way or another, from the Nazi blight.

Just a few days ago the Rockefeller Foundation annual report mentioned Prof. Bohr's work in biophysics on the border line between biology and physics as "only indirectly disturbed by the war." Prof. Bohr, a Nobelist, noted for his adaptaton of the bare quantum theory postulates of the early twentieth century to the problem of atomic structure, providing a foundation for present atomic theory, has visited America many times and he is widely known in this country.

In other Scandinavian areas much fruitful scientific research is underway in universities and scientific institutions all endangered by the German action.

Science News Letter, April 20, 1940

PATENTED

U. S. Commissioner of Patents Conway P. Coe and Mrs. Coe examine the patented flowers and fruit on exhibit in connection with the sesquicentennial celebration of the U. S. patent law.

CHEMISTRY

Dinitrophenol-Sulfanilamide Kills Tuberculosis Germ

Explosive Penetrates Bacillus To Make Entry for Drug; Chemists Also Hear of Explosives Without Glycerine

A COMBINATION of a chemical used during the World War as a high explosive, dinitrophenol, and the drug sulfanilamide is prolonging the lives, with possibilities of permanent cure, of guinea pigs having tuberculosis.

These animal experiments, not yet applied to humans but indicative of a possible method of treating human tuberculosis, were reported in Cincinnati to the American Chemical Society by N. L. Howell and E. C. Link of Memphis, Tenn., who said:

"While the experimental work is only preliminary, it is extremely significant that of the experimental animals treated, all, with the exception of one animal, lived from five to 15 months after date of infection. This is a ripe old age for tuberculous guinea pigs."

The use of the dinitrophenol is based on the idea that some chemical is needed to penetrate the bacillus causing tuberculosis so that entry can be made for the sulfanilamide. This idea, they added, is not new and is frequently necessary to stain certain micro-organisms in the laboratory. Carbolic acid, they said, is often used for this purpose.

Dinitrophenol, used by Howell and Link, is a derivative of carbolic acid, or phenol.

Science News Letter, April 20, 1940

New German Explosive

A NEW explosive, known as P.E.T.N., is believed to be aiding Germany greatly in the present war, according to American explosives experts who attended the American Chemical Society meeting.

P.E.T.N. is a new explosive known only as a laboratory curiosity during the first World War. During the last five years, it has come into commercial production in Germany and to a smaller extent in England, France and the United States. The technical name of P.E.T.N. is pentaerythritol tetranitrate.

In Germany, even before fighting started, P.E.T.N. was used in blasting caps and it is believed that now it is being used as a constituent in the primers for military explosives. Primers act to set off the nitrocellulose materials in a shell which give the explosive effect.

Moreover, it is believed that P.E.T.N. could be used as a commercial explosive in Germany and so free nitroglycerine explosives for military use. During the first World War Germany developed liquid oxygen explosives for this purpose.

The main virtue of P.E.T.N. for Germany is that it does not require glycerine in its production. Glycerine is best obtained as a by-product of soap making and its production is closely tied to fats available for this purpose. Fats are very scarce in Germany. P.E.T.N. is made from formaldehyde, acetaldehyde and nitric acid.

Italy, too, has a new explosive known as T4, which has many of the virtues of Germany's P.E.T.N. T4 requires no glycerine in its fabrication. It is made from formaldehyde, ammonia and nitric acid but in commercial production the starting point is a material known as urotropin, sold medicinally in the United States as a remedy to aid kidney infections.

The technical name of T4 is the jawbreaking 26-letter word cyclotrimethyltrinitramine. Like Germany's P.E.T.N., it is used as a primer in military explosives. It probably cannot be used as the main charge in military explosives but it can be used in commercial blasting and demolition work. It is recalled that when Germany blew up French coal mines and industrial plants after the armistice in 1918 they used their secondary explosives of liquid oxygen for this work rather than their military explosives of the nitrate type. In the present war P.E.T.N. and T4 will probably take over such jobs.

Science News Letter, April 20, 1940

One automobile manufacturer reports finding a way to make some of the larger structural parts of a car from *plastic* at reasonable cost.

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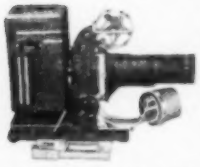

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PWA REPORT

A Babylonian king's Public Works report is this four-inch buff-colored clay cone now at Princeton University. Removing gypsum crystals and sand without damaging the 4,000-year-old writing beneath was achieved by Dr. Earle R. Caley, Princeton chemist. The report tells of reconstructing the city of Namgarum by King Libit-Ishtar.

NEW BOOKS ON SCIENCE

Science News Letter presents a comprehensive list of scientific books published or to be published between January 1 and June 30, 1940. All information is believed to be correct but is not guaranteed. Prices are listed where known. Prices marked * are tentative.

Aeronautics

AERODYNAMICS FOR MODEL AIRCRAFT—Zier Avrum—*Kemp*, $2.75*.

AERONAUTICAL DICTIONARY AND REFERENCE LIBRARY—R. Hartley, Jr.—*DeVorss*, $5.

AIR POWER—Al Williams—*Coward*, $2.50.

AIRCRAFT—Pennsylvania Federal Writers Project—*Whitman*, 50c.

AIRCRAFT INSTRUMENTS—George E. Irvin—*McGraw*.

AIRPORTS—John Walter Wood—*Coward*, $10.

ARMIES WITH WINGS—James L. H. Peck—*Dodd*, $2.50.

THE AVIATION BUSINESS—Elseth E. Freudenthal—*Vanguard*, $3.

EXPERIMENTAL AERODYNAMICS—Henry Christensen Pavian—*Pitman*, $2.50.

FLIGHT WITHOUT POWER—Lewin B. Barringer—*Pitman*, $3.50.

HOW TO FLY A PLANE—H. P. Oldham—*Waverly House*, $2.50.

PRACTICAL FLYING IN WAR AND PEACE—A. H. Munday—*Harper*, $2.50*.

SIMPLE AERODYNAMICS AND THE AIRPLANE—C. C. Carter—*Ronald*, $4.50.

SKY ROADS—Ernest K. Gann—*Crowell*, $2.

THE STORY OF FLYING—Archibald Black—*Whittlesey*, $2.75.

WIN YOUR WINGS—Vol. I, Primary Aviation Training Manual; Vol. II, Advanced Aviation Training Manual—Roscoe Turner and Jean H. Dubuque—*Drake*, $3.50 each vol.

Anthropology

ACCULTURATION IN SEVEN AMERICAN INDIAN TRIBES—Ralph Linton, ed.—*Appleton*, $4.

ANCIENT ORIENTAL CYLINDER AND OTHER SEALS WITH A DESCRIPTION OF THE COLLECTION OF MRS. WILLIAM H. MOORE—Gustavus A. Eisen—*U. Chicago*, $5.

ANCIENT SEALS FROM THE NEAR EAST—Richard Martin—*Field Mus.*

THE ANTHROPOLOGY OF IRAQ, Part I, The Upper Euphrates—Henry Field—*Field Mus.*

COOS MYTH TEXTS — Melville Jacobs — *U. Wash.*

COSTUMES AND TEXTILES OF THE AZTECAN INDIANS OF THE CUETZALAN REGION, PUEBLA, MEXICO—Donald B. and Dorothy M. Cordry—*Southwest Mus.*, $1.

CRANIOMETRY OF NEW GUINEA—Wilfrid D. Hambly—*Field Mus.*, $2.50.

DAILY LIFE IN ANCIENT ROME—J. Carocopino—*Yale*, $4.

THE DEVELOPMENT OF SOCIAL THOUGHT—Emory S. Bogardus—*Longmans*, $3.50.

THE DISCOVERY OF MAN—Stanley Casson—*Harper*, $3*.

THE ECONOMIC LIFE OF PRIMITIVE PEOPLES—Melville J. Herskovits—*Knopf*, $4.50.

ESSAYS IN POLYNESIAN ETHNOLOGY—Robert W. Williamson, ed. by Ralph Piddington—*Cambridge (Macmillan)*, $7.

THE EXCAVATIONS AT DURA-EUROPOS (Preliminary Report of the Seventh and Eighth Seasons of Work)—M. Rostovtzeff, F. E. Brown and C. B. Welles—*Yale*, $7.50.

FIJIAN FRONTIER—Laura Thompson—*Inst. of Pacific Relations*, $2.

THE GIMILSIN TEMPLE AND THE PALACE OF THE RULERS AT TELL ASMAR—H. Frankfort, S. Lloyd, T. Jacobson and G. Martiny—*U. Chicago*, $12.

HAWAIIAN MYTHOLOGY—Martha Beckwith—*Yale*, $5.

INDIANS OF THE UNITED STATES—Clark Wissler—*Doubleday*, $3.75.

INDIANS OF THE WESTERN GREAT LAKES—W. Vernon Kinietz—*U. Mich.*

INGALIK MATERIAL CULTURE—C. Osgood—*Yale*, $4.

MANKIND IN THE MAKING—M. Cathcart Borer—*Warne*, $1.50.

MEDINET HABU IV; FESTIVAL SCENES OF RAMSES III—The Epigraphic Survey (Harold H. Nelson, Field Director)—*U. Chicago*, $35.

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PASCUA, A YAQUI VILLAGE IN ARIZONA—Edward H. Spicer—*U. Chicago*, $3.50.

PENOBSCOT MAN: The Life History of a Forest Tribe in Maine—Frank G. Speck—*U. Penn.*, $4.

A PILLARED HALL FROM A TEMPLE AT MADURA, INDIA, IN THE PHILADELPHIA MUSEUM OF ART—W. Norman Brown—*U. Penn.*, $2.

POPULATION CHANGES IN THE RIO GRANDE GLAZE-PAINT AREA—H. P. Mera—*Lab. of Anthropology, Santa Fé*, $2.

PREHISTORY IN HAITI—Irving Rouse—*Yale*, $2.50*.

THE PREHISTORY OF UGANDA PROTECTORATE—T. P. O'Brien — *Cambridge (Macmillan)*, $7.50.

THE PUYALLUP-NISQUALLY — Marian W. Smith—*Columbia U.*, $5.

RACE, LANGUAGE AND CULTURE—Franz Boas—*Macmillan*, $5.

RACES OF THE WORLD—Ruth Benedict—*Modern Age Bks.*, $2.50.

SOCIAL ORGANIZATION OF THE PAPAGO INDIANS—R. M. Underhill—*Columbia U.*, $3.50.

SOUTH OF YESTERDAY—Gregory Mason—*Holt*, $3.

THE SWAZI—Brian Allen Marwick—*Cambridge (Macmillan)*, $6.50*.

A VARIATION OF SOUTHWESTERN PUEBLO CULTURE—Jesse D. Jennings and Georg K. Neumann—*Lab. of Anthropology, Santa Fé.*

VIKING AND THE RED MAN: The Old Norse Origin of the Algonquin Language—Reider T. Sherwin—*Funk*, $2.50.

WE CALLED THEM INDIANS—Flora Warren Seymour—*Appleton*, $2.

WESTWARD FROM VINLAND—Hjalmar R. Holand—*Duell, Sloan & Pearce*, $3.50.

Astronomy

BIRTH AND DEATH OF THE SUN—G. Gamow—*Viking*, $3.

COPERNICUS, The Founder of Modern Astronomy—Angus Armitage—*Norton*, $3.

DEFINITIVE ORBITS OF COMETS BARNARD-BROOKS, 1889 I., and VAN BIESBROECK, 1935 d.—George Van Biesbroeck—*U. Chicago*, $1.

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THE EARTH AS A CLOCK—H. Spencer Jones—*Oxford U.*, 75c.

LIFE ON OTHER WORLDS—H. Spencer Jones—*Macmillan*, $3*.

LOOKING AT THE MOON—Pennsylvania Federal Writers Project—*Whitman*, 50c.

THE MASSES OF THE STARS WITH A GENERAL CATALOGUE OF DYNAMICAL PARALLAXES—H. N. Russell and C. E. Moore—*U. Chi.*, $3.50.

THE PINPOINT PLANETARIUM—Armand Spitz—*Holt*, $2.

SPECTRA OF LONG-PERIOD VARIABLE STARS—Paul W. Merrill—*U. Chicago.*

THE STAR-GAZER—Zsolt de Harsanyi, tr. by Paul Tabor—*Putnam's*, $2.75.

SURVEY OF ASTRONOMY—Fisher and Lockwood—*Wiley.*

Biology

ADVANCES AND APPLICATIONS OF MATHEMATICAL BIOLOGY—Nicolas Rashevsky—*U. Chicago*, $2.

ADVENTURES IN BIOLOGY (Pupil Projects in Biology)—Various authors—*N. Y. Assn. of Biology Teachers*, 50c.

ADVENTURES OF A BIOLOGIST—J. B. S. Haldane—*Harper*, $3.

ANIMAL BIOLOGY, 2d ed.—R. H. Wolcott—*McGraw.*

APPLIED MYCOLOGY, New ed.—L. D. Galloway—*Chem. Pub.*, $4.

BIOLOGY IN THE MAKING—E. E. Snyder—*McGraw*, $2.80.

THE CONTROL OF ORGANISMS—F. L. Fitzpatrick—*Teachers Coll., Columbia*, $2.75.

THE CYTOPLASM—A. Guilliermond—*Chronica Botanica*, $3.70*.

EVERYDAY BIOLOGY—Francis D. Curtis, Otis W. Caldwell and Nina H. Sherman—*Ginn*, $1.92.

EVOLUTION OF DIFFERENTIATION—J. C. Willis—*Cambridge (Macmillan)*, $3.50*.

FUNDAMENTALS OF BIOLOGY, 3d ed.—A. W. Haupt—*McGraw*, $3.

HIGH SCHOOL BIOLOGY—John W. Ritchie—*World Bk.*

HUMAN BIOLOGY—G. A. Baitsell—*McGraw.*

INDUSTRIAL MICROBIOLOGY—S. C. Prescott and C. G. Dunn—*McGraw.*

LABORATORY DIRECTIONS FOR GENERAL BIOLOGY, 3d ed.—A. W. Haupt—*McGraw*, $1.

LABORATORY MANUAL OF GENERAL BIOLOGY—Arnold-Duggan—*Mosby.*

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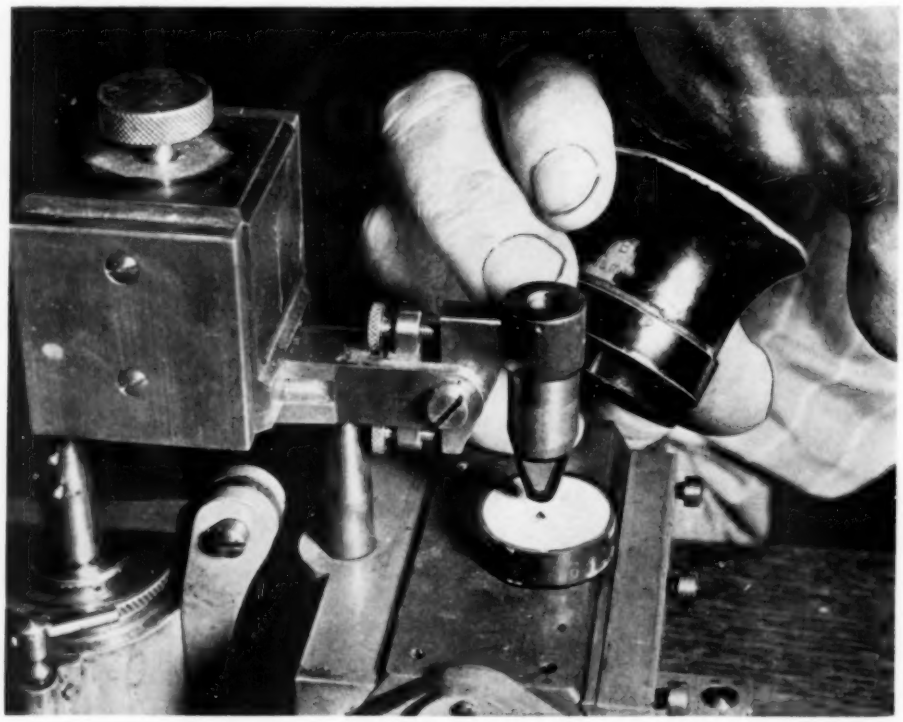
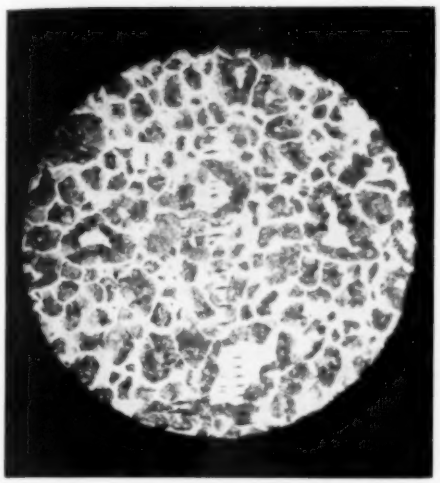


HOW HARD?

A tiny diamond that leaves its mark on the hardest materials—even on other diamonds—is mounted in the end of the thick, down-pointed steel "pencil". The operator watches results critically through a strong magnifier. See facing page.



ACCURATE

More accurate testing for hardness of steel and other materials becomes possible through the development of a new diamond indenting tool at the National Bureau of Standards, by Frederick Knoop, C. G. Peters and Walter B. Emerson. A tiny diamond at its tip is cut into a low rhomboidal or "diamond-shaped" pyramid. Pressed against the polished surface of a sample of steel or other material, this leaves marks of corresponding shape, as shown in this photomicrograph. Measurement of their diagonals gives an index of hardness, of greater accuracy than has been obtainable with points of ball, cone, square or other symmetrical shapes. Only relatively light loading (less than a kilogram) is required for these diamond hardness tests. This means that the device can be used on fragile materials like glass, as well as on metals.

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BOTANY

Desert Flowers

• "Contrary to the usual opinion, there is not a month in the year when no plants are in flower on the desert; we may truly say that the flower season of the desert lasts all through the year. Of course the great spectacular show of color comes in the spring — February through March on the Colorado Desert, and April through May on the Mohave. In the arid piñon-juniper areas the floral season begins early in May and lasts through June. Some of the shrubby composites, such as the rabbit brushes, do not come into flower until autumn."—Edmund C. Jaeger in DESERT WILD FLOWERS (*Stanford*).

Science News Letter, April 20, 1940

ZOOLOGY

Playing Dead

• "Some animals—for example, the common hognose snake and the opossum—often pretend to be dead when they know an enemy is near. The hognose snake lies on its back while 'playing dead'. If turned over, it immediately throws itself again upon its back with absurd haste. It seems very much alive in its effort to appear dead."—Francis D. Curtis, Otis W. Caldwell and Nina Henry Sherman in EVERYDAY BIOLOGY (*Ginn*).

Science News Letter, April 20, 1940

AGRICULTURE

Useful Worms

• "Take earthworms, for example. . . . The Burbank of the earthworms is Dr. George S. Oliver. . . . Some of the startling news that has come out of his laboratory includes: that worms can be grown as a protein supplement feed for poultry, fish and frog farms; that others are valuable for medicinal oil; . . . that an acre of healthy soil contains about 1,500,000 earthworms; . . . that an adequate crew of worms on an acre of soil are equivalent to three skilled gardeners plus ten tons of rich manure each year."—Homer Paul Andersen in YOUR CAREER IN AGRICULTURE (*Dutton*).

Science News Letter, April 20, 1940

THORS SAY:

AERONAUTICS

Future Plane

• "In an effort to look ahead, the engineers of Consolidated Aircraft Corporation made an investigation of possible size limits in the light of aerodynamic and structural improvement up to 1938. . . . It was found thoroughly feasible . . . to construct an airplane weighing as much as 400,000 pounds gross. This tremendous craft would have a span of 272 feet, length of 144 feet and its wing surfaces would total 8,400 square feet. It would carry as many as 300 passengers, requiring a crew of about 30, and would have a cruising range of about 5,000 miles at 300 miles an hour!" —Archibald Black in THE STORY OF FLYING (*Whittlesey House*).

Science News Letter, April 20, 1940

ANTHROPOLOGY

Independent

• "There are individual cases of inventions or ideas in lands far apart that cannot be proved to be historically connected. The fork was used in Fiji and invented comparatively recently in Europe; the spear, projected by a thong wound spirally about the shaft, was used on the Admiralty Islands and in ancient Rome. In some cases the difference in time makes the theory of a transfer all but unthinkable."—Franz Boas in RACE, LANGUAGE AND CULTURE (*Macmillan*).

Science News Letter, April 20, 1940

PHYSICS

Finite

• "One interesting thing Einstein has told us about our universe of space-time is that it is not infinite, stretching out endlessly, but is quite definitely limited. The correct expression is that it is 'finite.' If you could set out on a journey through the universe—apparently in a straight line—you would eventually come back to your starting-point. In fact the universe is, in four dimensions, what the sphere is in three and the circle is in two."—H. A. Reason in THE ROAD TO MODERN SCIENCE (*Appleton*).

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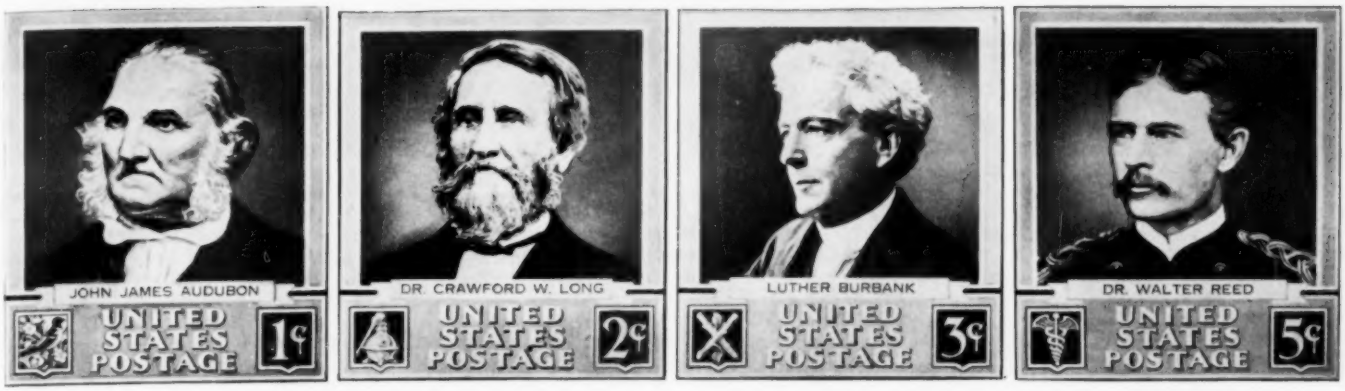

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